

<b>Notice of Allowability</b>	Application No.	Applicant(s)
	09/768,083	ZHANG ET AL.
	Examiner Kandasamy Thangavelu	Art Unit 2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to January 25, 2005.

2.  The allowed claim(s) is/are 1,3,5,6,10 and 16.

3.  The drawings filed on 23 July 2001 are accepted by the Examiner.

4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)  All    b)  Some\*    c)  None    of the:

1.  Certified copies of the priority documents have been received.

2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.

(a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached

1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.

(b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- 1.  Notice of References Cited (PTO-892)
- 2.  Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3.  Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
- 4.  Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
- 5.  Notice of Informal Patent Application (PTO-152)
- 6.  Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
- 7.  Examiner's Amendment/Comment
- 8.  Examiner's Statement of Reasons for Allowance
- 9.  Other \_\_\_\_\_.

*[Handwritten Signature]*  
KEVIN J. TESKA  
SUPERVISORY  
PATENT EXAMINER

## **DETAILED ACTION**

### ***Introduction***

1. This communication is in response to the Applicants' communication dated January 25, 2005. Claims 1, 6, 10, 16, 18 and 20 were amended. Claims 1, 3, 5-8, 10-11 and 16-20 of the application are pending.

### ***Drawings***

2. The drawings submitted on July 23, 2001 are accepted.

### ***Examiner's Amendment***

3. Authorization for this examiner's amendment was given in a telephone conversation by Mr. James Bell on April 25, 2005.

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

4. In the Claims:

In Claim 1, Lines 1-2, "A method for calculating electromagnetic radiation in a computer system, comprising:"

has been changed to

-- A computer implemented method for calculating electromagnetic radiation in a computer system, comprising:--

In Claim 6, Lines 1-2, "A method of designing a computer system, comprising:"

has been changed to

-- A computer implemented method of designing a heat sink for a computer system, comprising: --

In Claim 6, Lines 17-21, "estimating the electromagnetic fields produced by the central processing unit using finite differences in the time domain (FDTD) to solve Maxwell's equation; and

using a fast Fourier transform to translate time domain data to frequency domain."

has been changed to

-- estimating the electromagnetic fields produced by the central processing unit using finite differences in the time domain (FDTD) to solve Maxwell's equation; using a fast Fourier transform to translate time domain data to frequency domain; reducing radiation noise by reducing capacitive coupling between the heat sink and the central processing unit;

reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit; and

designing the heat sink with adjusted number of fins, number of bars and fin geometry.--

In Claim 7:

Delete claim 7.

In Claim 8:

Delete claim 8.

In Claim 10, Lines 1-2, "A method of manufacturing a computer system, comprising:" has been changed to  
-- A computer program product in a computer readable medium, comprising computer executable instructions, which when executed by a computer perform a process for designing a heat sink for a computer system, the said process comprising:--

In Claim 10, Lines 21-24, "reducing radiation noise by reducing capacitive coupling between the heat sink and the central processing unit; and

reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit"

has been changed to

-- using a fast Fourier transform to translate time domain data to frequency domain;

reducing radiation noise by reducing capacitive coupling between the heat sink and the central processing unit;

reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit; and

designing the heat sink with adjusted number of fins, number of bars and fin geometry--.

In Claim 11:

Delete claim 11.

In Claim 16, Lines 1-5, "A computer system, comprising:

a central processing unit,

a heat sink coupled to the central processing unit, the heat sink having fins and bars, the computer system having electromagnetic radiation being determined by:"

has been changed to

-- A computer apparatus for designing a heat sink for a computer system, wherein said computer system comprises:

a central processing unit,

a heat sink coupled to the central processing unit, the heat sink having fins and bars, said apparatus comprising:

a processor unit for executing stored computer programs;

a memory unit for storing computer programs to be executed by the processor unit;

a computer program stored in the memory unit, comprising computer instructions, which when executed by the processor unit perform a process for designing a heat sink for said computer system, the said process comprising:--.

In Claim 16, Lines 22-26, "modeling characteristic radiation from the central processing unit as a modulated Gaussian pulse; and

estimating the electromagnetic fields produced by the central processing unit using finite differences in a time domain (FDTD) to solve Maxwell's equation."

has been changed to

-- modeling characteristic radiation from the central processing unit as a modulated Gaussian pulse;

estimating the electromagnetic fields produced by the central processing unit using finite differences in a time domain (FDTD) to solve Maxwell's equation;

using a fast Fourier transform to translate time domain data to frequency domain;

reducing radiation noise by reducing capacitive coupling between the heat sink and the central processing unit;

reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit; and

designing the heat sink with adjusted number of fins, number of bars and fin geometry.--.

In Claim 17:

Delete claim 17.

In Claim 18:

Delete claim 18.

In Claim 19:

Delete claim 19.

In Claim 20:

Delete claim 20.

***Reasons for Allowance***

5. Claims 1, 3, 5-6, 10 and 16 of the application are allowed over prior art of record.
6. The following is an Examiner's statement of reasons for the indication of allowable subject matter:

The closest prior art of record shows:

(1) an electronic device such as an IC, memory chip, microprocessor, switch, logic array etc has numerous signal lines whose electrical states are often switching up or down; any change in the current or voltage of an electronic signal causes electromagnetic radiation to be emitted; the RF radiation from the ICs can cause measurable voltage changes on signal lines resulting in a logic failure of nearby electronic device; the RF emissions from the electronic devices must be

kept at low levels; the IC devices are cooled by attaching a heat sink to the electronic package; the heat sink will have RF voltage caused by inductive coupling between the heat sink and the electronic device; grounded conductive shields are provided surrounding the heat sink and the IC package to reduce the level of RF noise (**Houghton et al**, U.S. Patent 6,282,095);

(2) a method of simultaneously coupling a heat sink to an electrical device and reducing the electromagnetic interference caused by the heat sink being coupled to the device; the electrical device is placed inside a socket on the PC board and has a heat sing thermally coupled to the top surface; the heat sink dissipates the heat from the electrical device; there exists capacitive coupling between the heat sink and the chip which makes the heat sink to act as an antenna for EMI radiation; a heat sink clip electrically engages with the socket; the electromagnetic radiation emitting from the electrical device is dissipated through the clip; (**Remsburg et al.**, U.S. Patent 5,804,875);

(3) an electromagnetic wave analyzer which numerically solves the electromagnetic wave problems using finite-difference time-domain (FDTD) method; the transient behavior of the electromagnetic waves is analyzed using computer simulation to solve Maxwell's equations in time and spatial domains (**Namiki**, U.S. Patent Application 2002/0099510); and

(4) an apparatus for dissipating heat from an electronic component such as a processor and for shielding electromagnetic radiation generated by the electronic component; the apparatus includes a heat sink configured to be mounted to the surface of the component and a conductor connected to the heat sink; the conductor provides electrical contact between the heat sink and the surface of the conductive enclosure (**Treober et al.**, U.S. Patent 6,664,463).

6.1 Applicants' first set of claims consists of Claims 1, 3 and 5.

Independent Claim 1 is directed to a computer implemented method for calculating electromagnetic radiation in a computer system. The claim identifies the uniquely distinct features of:

"determining current loop length defined by a current path over a surface of the heat sink and adjusting the current loop length by adjusting one or more of the number of fins, the number of bars and the fin geometry".

Because the closest prior art fails to teach or fairly suggest determining current loop length defined by a current path over a surface of the heat sink and adjusting the current loop length by adjusting one or more of the number of fins, the number of bars and the fin geometry, as claimed by the Applicants, Claims 1, 3 and 5 are deemed novel and allowable.

6.2 Applicants' second set of claims consists of Claim 6.

Independent Claim 6 is directed to a computer implemented method of designing a heat sink for a computer system. The claim identifies the uniquely distinct features of:

"determining current loop length defined by a current path over a surface of the heat sink and adjusting the current loop length by adjusting one or more of the number of fins, the number of bars and the fin geometry".

Because the closest prior art fails to teach or fairly suggest determining current loop length defined by a current path over a surface of the heat sink and adjusting the current loop

length by adjusting one or more of the number of fins, the number of bars and the fin geometry, as claimed by the Applicants, Claim 6 is deemed novel and allowable.

6.3 Applicants' third set of claims consists of Claim 10.

Independent Claim 10 is directed to a computer program product in a computer readable medium, comprising computer executable instructions, which when executed by a computer perform a process for designing a heat sink for a computer system. The claim identifies the uniquely distinct features of:

"determining current loop length defined by a current path over a surface of the heat sink and adjusting the current loop length by adjusting one or more of the number of fins, the number of bars and the fin geometry".

Because the closest prior art fails to teach or fairly suggest determining current loop length defined by a current path over a surface of the heat sink and adjusting the current loop length by adjusting one or more of the number of fins, the number of bars and the fin geometry, as claimed by the Applicants, Claim 10 is deemed novel and allowable.

6.4 Applicants' fourth set of claims consists of Claim 16.

Independent Claim 16 is directed to a computer apparatus for designing a heat sink for a computer system. The claim identifies the uniquely distinct features of:

"determining current loop length defined by a current path over a surface of the heat sink and adjusting the current loop length by adjusting one or more of the number of fins, the number of bars and the fin geometry".

Because the closest prior art fails to teach or fairly suggest determining current loop length defined by a current path over a surface of the heat sink and adjusting the current loop length by adjusting one or more of the number of fins, the number of bars and the fin geometry, as claimed by the Applicants, Claim 16 is deemed novel and allowable.

7. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is 571-272-3717. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska, can be reached on 571-272-3716. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC 2100 Group receptionist: 571-272-2100.

K. Thangavelu  
Art Unit 2123  
April 25, 2005



KEVIN J. TESKA  
SUPERVISORY  
PATENT EXAMINER